1) How much work is done in lifting a 10 kg object 7 m ?
2) A 300 g mass is hung from a spring. The spring constant is $40 \mathrm{~N} / \mathrm{m}$. How far will the spring stretch? Give your answer in cm .
3) A person carries a 40 kg air conditioner up a staircase that is 5 m in the horizontal direction and 3 m in the vertical. How much work did the person do on the air conditioner?

If it took 45 s for the person to walk up the stairs with the air conditioner, how much power did they generate in this effort?

What was their power in horsepower? ( $1 \mathrm{hP}=746$ Watts $)$
4) A projectile is fired from the ground at an angle. The projectile reaches a maximum height of 70 m . The horizontal component of the projectile was $200 \mathrm{~m} / \mathrm{s}$. What was the range of the projectile?
5) A 30 kg box is being slid across a floor where the coefficient of friction $(u)$ is 0.4 . What is the force of friction?
6) A 60 N force acted on a 12 kg object. The object started at rest and the force was applied for 3 s . What was the final speed of the object?
7) A car was moving at $25 \mathrm{~m} / \mathrm{s}$ for I hour and 27 minutes. How far did the car go?

Answers: 4) 1520 m 5) $117.6 \mathrm{~N} \quad$ 6) $15 \mathrm{~m} / \mathrm{s} \quad$ 7) $130,500 \mathrm{~m}$
8) A young child was fooling around at the grocery store. They let go of their shopping cart. The shopping cart and contents had a mass of 15 kg . Their cart was moving at $4 \mathrm{~m} / \mathrm{s}$ when it struck a cart with a mass of 35 kg that was at rest. A dozen eggs were broken. The child's cart slowed down to $1 \mathrm{~m} / \mathrm{s}$. What was the speed of the 35 kg cart?
9) A projectile is fired horizontally from a platform. The range of the projectile was 400 m and the initial velocity was $80 \mathrm{~m} / \mathrm{s}$. What was the height of the platform?
10) A 25 kg child was going down a large slide at the fair. The height of the slide was 30 m . What is the child's potential energy at the top of the ride?

What was the child's total energy at the top of the slide?

What was the child' total energy at the bottom of the slide?

What was the child's speed at the bottom of the slide?
11) A 70 kg astronaut is on a planet that has a mass of $7 \times 10^{25} \mathrm{~kg}$. The planet has a radius of $5 \times 10^{7} \mathrm{~m}$. What is the weight (also known as force of attraction) of the astronaut?

What is the acceleration due to gravity on this planet?
12) A boat on a river, heads east at $10 \mathrm{~m} / \mathrm{s}$. The current pushes the boat south at $7 \mathrm{~m} / \mathrm{s}$. Draw a head to tail diagram representing this scenario. Calculate the resultant velocity of the boat.
13) A person applies a 70 N force to a 40 kg box on a warehouse floor. Draw a free body diagram of this. The box accelerates at $1 \mathrm{~m} / \mathrm{s}^{2}$. What is the coefficient of friction between the box and the floor?

Answers: 11) $131 \mathrm{~N} \quad 1.9 \mathrm{~m} / \mathrm{s}^{2} \quad$ 12) $12.2 \mathrm{~m} / \mathrm{s} \quad$ 13) 0.0765

